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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,033	03/25/2004	Takatomo Sasaki	10873.1440US01	5813
53148	7590	03/07/2006	EXAMINER	
HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902-0902 MINNEAPOLIS, MN 55402			HECKENBERG JR, DONALD H	
			ART UNIT	PAPER NUMBER

1722

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/809,033

**Applicant(s)**

SASAKI ET AL.

**Examiner**

Donald Heckenberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 47-52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: _____  |

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1. Applicant's election of Group I (claims 1-46) in the reply filed on 23 September 2005 is acknowledged. Because Applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse. MPEP § 818.03(a).

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Hunter (U.S. Pat. No. 6,296,956).

Hunter discloses a method for forming single crystals of aluminum nitride. The method includes a step of heating a source material so as to sublime or evaporate the material into an aeriform-gas substance (cl. 2, ll. 54-67). The aeriform substance is then crystallized to grow the single crystal under

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pressure (see example at cl. 12, l. 45 - cl. 13, l. 20). Hunter notes that using the method, growth rates of greater than 0.5 mm/hour (500  $\mu$ m/hour) are achieved (cl. 3, ll. 30-36).

Hunter discloses that solid forms of aluminum or aluminum nitride powder may be used as an initial source material for the aeriform gas (cl. 2, ll. 54-57). Hunter also discloses the method may include the use of mixtures nitrogen, ammonia, and inert gases as carrier gases for the source material (cl. 2, l. 59 - cl. 3, l. 10; cl. 12, ll. 13-21). Hunter still further discloses impurities may be included in the gases so as to then be included in the crystal (cl. 12, ll. 1-15).

In various embodiments, Hunter notes that the aluminum source material is heated between 1000 °C to 2400 °C (cl. 10, ll. 61-64), and the pressure may be held at 1,000 torr (1.32 atm) during part of the crystal growth phase (cl. 13, ll. 1-5). Hunter also notes embodiments wherein films such as single crystal aluminum nitride or silicon carbide may be used as a seed-nucleus on which the single crystal is grown (cl. 12, ll. 36-42), with such a seed-nucleus having a diameter such as 2.25 inches (cl. 12, ll. 50-54).

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4. Claims 1-5, 33, 34, 45, and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Schowalter (U.S. Pat. No. 6,770,135).

Schowalter discloses a method for producing large, single-crystals of aluminum nitride. In Schowlater's method, a source material of aluminum nitride is heated to evaporate or sublimate in order to form a aeriform substance (cl. 13, ll. 46-55). The aeriform substance is then crystallized under super-atmospheric pressure to grow the aluminum nitride single crystal (cl. 13, l. 55 - cl. 14, l. 27).

Schowalter further discloses the method to be conducted in an nitrogen gas containing atmosphere (see for example, cl. 13, ll. 40-46). Using the disclosed method, Schowalter notes growth rates of 0.9 mm/hr may be achieved (cl. 14, ll. 28-36).

5. The following reference cited but not relied upon is deemed pertinent to the instant application:

Hunter (U.S. Pat. No. 6,086,672) discloses growth of bulk single crystals of aluminum nitride: silicon carbide alloys.


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald

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Heckenberg whose telephone number is (571) 272-1131. The examiner can normally be reached on Monday through Friday from 9:30 A.M. to 6:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith, can be reached at (571) 272-1166. The official fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<<http://pair-direct.uspto.gov>>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

  
Donald Heckenberg  
Primary Examiner  
A.U. 1722

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